

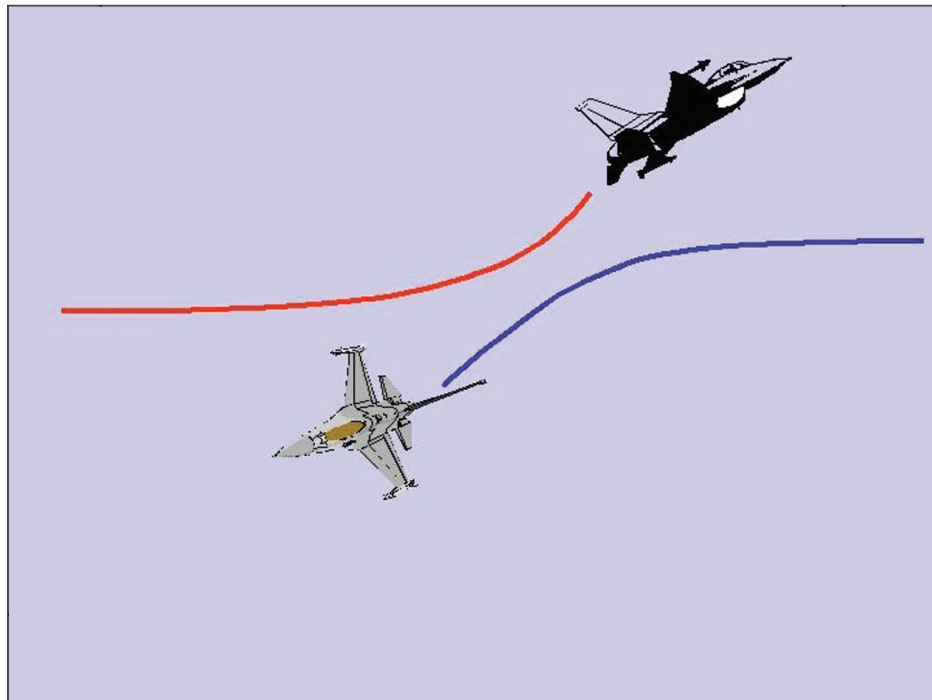


Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

AUTOMATIC AIR COLLISION AVOIDANCE SYSTEM TEST SUCCESSFUL



The automatic Air Collision Avoidance System (ACAS) uses Situational Awareness Data Link (SADL) data to determine if a collision is imminent and, if so, temporarily takes control of the aircraft away from the pilot for a very short time and steers each aircraft into an optimal escape maneuver. As soon as the aircraft begin to diverge, the system returns control to the pilot. If one of the aircraft involved is an unmanned air vehicle (UAV), then the UAV will always give ground unless otherwise necessary.



Air Force Research Laboratory
Wright-Patterson AFB OH

Accomplishment

The Air Vehicles Directorate successfully tested the auto ACAS in two flight sessions held at Edwards Air Force Base (AFB), California. This particular block of tests focused on the SADL data link, a component of the ACAS located inside the aircraft that transmits data between itself and surrounding aircraft.

In all cases, the F-16 and the virtual target aircraft established the necessary data link and transmitted data between the two aircraft, and overall SADL performance improved over the course of the two sessions. Both US and Swedish pilots who have flown the auto ACAS simulations agree that it has potential as a valuable tool because it activates at the right time. They find it most beneficial during times when pilots lose sight of each other and do not realize a collision may be imminent.

Background

The directorate developed ACAS as the first fully automatic air collision avoidance system for use in military aircraft. Previous collision avoidance systems were always manual—a tone gave the pilot a collision warning and the pilot performed a quick assessment and evasion maneuver.

However, a manually operated system would not work with fighter aircraft since normal pilot reaction time is too slow. The collision alarm would sound constantly during a typical, close-in, air combat scenario with multiple enemy and friendly aircraft. The ACAS allows rapidly maneuvering fighters to operate together without the concern of pilot reaction time.

The effort to develop the ACAS started in 2000 when officials from the US Air Force Safety Center at Kirtland AFB, New Mexico, wanted to look into the possibility of an automatic anti-collision system to prevent fighter mishaps. The safety center asked the directorate's Control Sciences Division to undertake this task because of its success in developing the automatic Ground Collision Avoidance System.

Other ACAS development team members included the National Aeronautics and Space Administration's Dryden Flight Research Center and Sweden's Forsvaret Materielverk. Sweden is looking into implementing the system into their Gripen fighter.

Restrictions on where UAVs can currently operate in the US are leading the effort to get unmanned aircraft outfitted with the ACAS. Currently, UAVs can only operate in limited areas or at very high altitudes over the country. In order for UAVs to be a fully operational part of the Air Force, they must fly to where they are needed and not depend on other transportation to get them there, even if it means flying in the same airspace used by private and commercial aircraft.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-VA-05)

Air Vehicles
Support to the Warfighter